

Notice of Allowance dated 01/24/2008

Appl. No. 10/537,602

Amdt. dated January 30, 2008

Attorney Docket No. 1217-051662

In the Title:

Please replace the title on page 1, lines 3-5, with the following rewritten title:

-- PROCESS FOR PRODUCING COLORED SPHERICAL POLYMER PARTICLES --

Amendments to the Specification:

Please replace the paragraph beginning at page 5, line 13, with the following rewritten paragraph:

-- Japanese Patent Laid-Open No. 352421/1999 (patent document 7) discloses a process for producing two-color color separated display rotation particles ~~for used~~ for use in display of PLDs and the like. In this production process, different color layers are formed on hemispherical surfaces of microballs by a thin-film preparation method such as a vacuum deposition method, a sputtering method, a chemical vapor deposition method, or a spinner coating method. --

Please replace the paragraph beginning at page 16, line 21, with the following rewritten paragraph:

-- Fig. 5 is a conceptual perspective diagram showing a representative embodiment of the apparatus for producing colored spherical polymer particles of three hues using ~~microchannels~~ microchannels according to the present invention; --

Please replace the paragraph beginning at page 19, line 2, with the following rewritten paragraph:

-- As already described above, the production process of colored spherical particles according to the present invention utilizes microchannels including, for example, a first microchannel through which a colored continuous phase of an O phase is transferred and a second microchannel through which a spheroidizing phase of a W phase flows at a predetermined flow rate of F2 (ml/h), said colored continuous phase and said spheroidizing phase being in an O/W (oil-in-water) or W/O (water-in-oil) relationship with each other, and, when the colored continuous phase is discharged from the first microchannel into and mixed and dispersed in the second microchannel, the colored continuous phase is brought to colored spherical polymer particles ~~while flow~~ while flowing through the second microchannel. --

Notice of Allowance dated 01/24/2008

Appl. No. 10/537,602

Amdt. dated January 30, 2008

Attorney Docket No. 1217-051662

Please replace the paragraph beginning at page 20, line 2, with the following rewritten paragraph:

-- Accordingly, in the present invention, the colored continuous phase as the O or W phase can be properly transferred through the first microchannel or discharged into the second microchannel at a flow rate F1 of 0.01 to 10 (ml/h), preferably 001 to 5 (ml/h), although the flow rate varies depending upon the viscosity, surface tension, density, liquid properties (polar group) of medium and the like of the colored fluid medium to be transferred. The spheroidizing phase can be allowed to flow through the second microchannel at a predetermined flow rate F2 (ml/h) which is a flow rate suitable for the discharged colored continuous phase to be properly spheroidized ~~while flow~~ while flowing through the second microchannel, specifically at a flow rate F2 of 1 to 100 (ml/h), preferably 1 to 50 (ml/h). --

Please replace the paragraph beginning at page 21, line 4, with the following rewritten paragraph:

-- The colored continuous phase discharged into the second microchannel should be spheroidized during discharge, dispersion and transfer, and the polymerizable resin component in the discharged colored continuous phase should be properly polymerized and cured. In the present invention, the shape of spheres of the discharged colored continuous phase after the spheroidization is stable. Therefore, the polymerizable resin component is not always required to be fully ~~polyemrized~~ polymerized and cured during flow through the second microchannel, and the polymerization and curing may be properly carried out under UV irradiation and/or heating in a separate container as a recovery tank for colored spherical particles provided outside the second microchannel system. --

Please replace the paragraph beginning at page 38, line 13, with the following rewritten paragraph:

-- The colored spherical polymer particles according to the present invention are suitably produced, for example, using the first microchannel-type production apparatus according to the present invention shown in Fig. 1 and the second microchannel-type production apparatus according to the present invention shown in Figs. 2 and 4. In the production of the colored spherical polymer particles, a colored continuous phase of one hue or at least two hues, transferred through the first microchannel, comprising an oily (O phase) or aqueous (W phase)

Notice of Allowance dated 01/24/2008

Appl. No. 10/537,602

Amtd. dated January 30, 2008

Attorney Docket No. 1217-051662

fluid medium containing a polymerizable resin component and, dispersed in the fluid medium, a color dye/pigment insoluble in the fluid medium is discharged into an aqueous (W phase) or oily (O phase) spheroidizing phase flowing through the second microchannel either continuously or intermittently. The discharged colored continuous phase and the spheroidizing phase are in an O/W or W/O relationship with each other, and, in this relationship, the discharged colored continuous phase is brought to monodisperse colored spherical polymer particles ~~while flow~~ while flowing through the spheroidizing phase. --

Please replace the paragraph beginning at page 51, line 14, with the following rewritten paragraph:

-- Regarding an experimental apparatus, for mixing the monomers together, in an apparatus shown in Fig. 4, the reactive solution A-1 and the reactive solution A-2 were allowed to flow into each other to form a solution A. Next, in a microchannel apparatus in which three microchannels, first to three microchannels, crossed one another, the solution A was discharged from the first ~~microchannel~~ microchannel located at the center of the crossed microchannels, at a flow rate of ~~(1 ml/hr)~~ 1 (ml/hr) into the fluid medium B which flows at a flow rate of 30 (ml/hr) through the third and fourth microchannels located on respective both sides of the first microchannel, followed by passage through a PTFE tube having a tube inner diameter of 1 mm while passage through a warm water bath of 90°C for polymerization. The above procedure provided black/white fine polymer particles having a uniform particle diameter. The particle diameter was 100 μm , and the CV value was 2%. --

Please replace the paragraph beginning at page 58, line 8, with the following rewritten paragraph:

-- As described above, colored spherical resin particles of one hue, two hues, or three hues having an average particle diameter of 1 to 400 μm and possessing excellent monodispersibility can be provided by using a colored continuous phase(s) and a spheroidizing phase in an O/W or W/O relationship in combination with a microchannel-type production apparatus using a ~~combinatioin~~ combination of a plurality of microchannels according to the present invention. --